

CLAIMS

What is claimed is:

- 1.A method of modulating cell death in a eukaryotic cell, comprising contacting the cell with an agent that modulates a biological activity of DNA-PK.
- 2.The method of claim 1, wherein the biological activity of DNA-PK is a kinase activity of DNA-PKcs.
- 3.The method according to claim 2, wherein DNA-PKcs kinase activity is increased in the cell, thereby decreasing cell death.
- 4.The method according to claim 1, wherein the agent comprises an immunomodulatory nucleic acid molecule.
- 5.The method according to claim 2, wherein DNA-PKcs kinase activity is decreased in the cell, thereby increasing cell death.
- 6.A method of reducing cell damage mediated by a hypoxic condition, comprising contacting the cell with an agent that modulates a biological activity of DNA-PK.
- 7.The method of claim 6, wherein said agent is an immunomodulatory nucleic acid molecule.
- 8.A method for identifying an agent that modulates a biological activity of DNA-PK, comprising:

- a) adding an agent to be tested to a sample, the sample comprising DNA-PK and an immunomodulatory nucleic acid molecule, under conditions which favor binding of the immunomodulatory nucleic acid molecule to DNA-PK, thereby forming a test sample; and
- b) detecting a biological activity of DNA-PK protein in the test sample, as compared to a control sample lacking the agent, wherein an increase or a decrease in the biological activity of DNA-PK indicates that the agent modulates a biological activity of DNA-PK.

9.The method of claim 8, wherein the biological activity of DNA-PK is binding to an immunomodulatory nucleic acid molecule.

10.The method according to claim 9, wherein the method is a cell-free method, and the immunomodulatory nucleic acid molecule is detectably labeled.

11.The method of claim 8, wherein the biological activity of DNA-PK is activation of DNA-PKs kinase activity.

12.The method of claim 8, wherein the method is a cell-based method and modulation of DNA-PK activity is detected by measuring an amount of IL-6 or IL-12 produced by the cell.

13.A composition comprising:

- a) an agent identified by the method of claim 8; and
- b) a pharmaceutically acceptable excipient.

14. A method for reducing DNA damage in a eukaryotic cell, comprising contacting the cell with an agent that modulates a biological activity of DNA-PK.

15. The method of claim 14, wherein the biological activity of DNA-PK is a kinase activity of DNA-PKcs.

16. The method of claim 15, wherein said agent is an immunomodulatory nucleic acid molecule.

17. A method of reducing cell death in an individual, comprising administering to an individual an effective amount of an agent that modulates a biological activity of DNA-PK.

18. The method of claim 17, wherein the cell death is triggered by an ischemic condition.

19. A method of reducing cell death in an organ, comprising contacting a cell of the organ with an effective amount of an agent that modulates a biological activity of DNA-PK.

20. The method of claim 19, wherein the contacting is performed *ex vivo*.